

D2.1 Best practice pedagogical guidelines in monitoring the progress of teachers' and learners' attitudes, knowledge, and skills

Institut za varilstvo [IZV]

1. Introduction

In the ever-evolving landscape of welding education, staying at the forefront of industry standards and pedagogical methodologies is paramount. At IZV, we understand the pivotal role that proficient trainers play in shaping the next generation of MIG/MAG welders. Recognizing the need for continuous improvement, we embarked on a transformative journey to enhance our MIG/MAG welding training course, starting with a comprehensive course for our instructors.

This article delves into the dynamic process of designing and implementing a comprehensive training program aimed at upskilling our MIG/MAG trainers. The focus was not only on refining their expertise in traditional welding techniques but also on equipping them with innovative learning techniques and cutting-edge technologies. Furthermore, our discussions extended to the integration of the European Welding Federations (EWF) guidelines, ensuring that our training aligns seamlessly with industry standards.

We laid the foundation for a forward-thinking MIG/MAG welding training program at IZV.

2. Structure of our train the trainers course

2.1 Implementation of new EWF guidelines into practical training

As the MIG/MAG welding landscape undergoes transformative changes, we recognized the imperative of aligning our training practices with the industry's gold standard – the European Welding Federation (EWF) guidelines. This endeavor was not merely an adaptation; it was a commitment to staying at the forefront of welding education, providing our trainers with the tools and insights needed to educate the welders of tomorrow.

The implementation process began with a comprehensive review of the EWF guidelines, dissecting each element to understand the nuances that set these standards apart. We facilitated workshops and training sessions specifically dedicated to familiarizing our instructors with the intricacies of the new guidelines. These sessions were designed not only to educate but to spark discussions, encouraging our trainers to actively engage with the changes and comprehend the reasoning behind each modification.

One of the key aspects of our approach was to highlight the differences between our existing curriculum and the EWF guidelines. We believed that clarity and transparency in understanding the variations were essential for a smooth transition. Through the workshop, our instructors gained insights into the rationale behind the changes, emphasizing how these adjustments align with the latest industry practices and technological advancements.

By breaking down the differences and fostering open dialogues, we empowered our instructors to embrace the EWF guidelines not as an imposition but as an evolution—an evolution that

propels our MIG/MAG welding training course to new heights. This process not only elevated the skill sets of our trainers but also instilled a sense of confidence and adaptability that they, in turn, could pass on to the aspiring welders under their guidance.

2.2 Implementation of innovative teaching methodologies

In our commitment to improving our MIG/MAG welding training, we identified educational innovations that are able to improve our teaching methods. The trainers knowledge of new methods is influencing how every aspect of our training course is approached.

Welding Simulator Implementation:

At the forefront of this revolution is the incorporation of welding simulators into our training repertoire. These advanced tools transcend the limitations of traditional training methods, offering a risk-free environment for trainees to hone their skills. Realistic simulations provide invaluable hands-on experience, allowing learners to perfect techniques and troubleshoot without the constraints of a physical workshop.

Zoom, Distance Learning:

Recognizing the need for flexibility in education, we seamlessly integrated Zoom into our theoretical lectures. This virtual platform transcends geographical boundaries, providing students with access to lectures from the comfort of their locations. Zoom's interactive features, such as live chat and real-time collaboration, have redefined the dynamics of distance learning, fostering engagement and connectivity despite physical distances.

Moodle and other LMS:

The adoption of Moodle as our learning management system has further streamlined our educational approach. This centralized platform serves as a repository for course materials, assignments, and collaborative activities. Moodle facilitates a seamless integration of various educational elements, ensuring that our MIG/MAG welding training program is not only comprehensive but also accessible to all participants.

Optimizing Recognition of Prior Learning (RPL):

Our commitment to inclusivity led us to actively seek ways to recognize and leverage the wealth of prior learning experiences that our trainees bring. Through Moodle questionnaires, we are able to assess the attendees knowledge about a specific topic, thus letting them pass through the course faster, if they already know a topic. We do not measure the hours needed to pass through the course, but request specific learning results. This makes recognition of prior learning possible also in the practical lectures.

Work-Based Learning:

Emphasizing the importance of practical, real-world experience, we implemented work-based learning strategies. This approach ensures that theoretical knowledge seamlessly translates into practical application, preparing our trainees for the demands of the actual welding industry. We applied WBL by presenting theoretical lectures alongside practical training. Thus, the attendees are able to make sense of the connection between theory and practice.

Videos as Educational Tools:

Harnessing the power of visual learning, we incorporated videos as a dynamic teaching medium. These videos go beyond mere demonstrations; they provide immersive experiences, showcasing real-world applications of MIG/MAG welding theory. This multimedia approach caters to diverse learning styles, enhancing comprehension and retention.

Classroom Lecture Evolution:

Acknowledging the importance of traditional classroom lectures, we reinvigorated our approach by integrating interactive techniques. From real-world applications to hands-on demonstrations, our lectures now transcend the theoretical realm, ensuring that every session is a dynamic and engaging learning experience.

2.3 Evaluation Strategies for Teachers' Knowledge Application

On March 16th, 2023, an impactful hybrid course for MIG/MAG welding trainers took place at the offices of Institut za varilstvo d.o.o. Nine dedicated trainers participated in this immersive training session, where they were exposed to a range of innovative teaching techniques, including the integration of welding simulators, Zoom lectures, Moodle platforms, and more. The dynamic course aimed at equipping trainers with cutting-edge methodologies for imparting knowledge effectively. Following the training, these nine trainers conscientiously applied their newly acquired skills and tested innovative teaching methods on their students. This hands-on approach not only reinforced their understanding of the techniques but also created a ripple effect, enriching the learning experiences of the broader community of aspiring MIG/MAG welders.



Figure 1: Teaching personnel taking class for the implementation of new technologies during MIG/MAG learning

Monitoring the implementation of new teaching techniques is crucial for several compelling reasons. Firstly, it ensures alignment with industry standards, allowing us to consistently deliver training that reflects the latest advancements and best practices in the field of MIG/MAG

welding. Secondly, monitoring provides a continuous feedback loop, offering valuable insights into the effectiveness of each technique. This feedback is instrumental in identifying areas of strength that can be celebrated and areas for improvement that can be addressed promptly. Moreover, consistent monitoring contributes to the overall quality and coherence of our training program, fostering a dynamic and responsive learning environment. It allows us to adapt to the diverse learning styles of our students, ensuring that the teaching methods resonate effectively with each individual. Ultimately, by monitoring the implementation of new techniques, we not only enhance the educational experience for both teachers and students but also uphold our commitment to delivering training that is at the forefront of industry standards and pedagogical excellence.

To assess the application of new teaching methods in the scope of MIG/MAG training course, we used a feedback questionnaire specifically designed either for trainers or for students. To get even more comprehensive feedback we conducted structured interviews with the teaching staff present.

2.3.1 Teacher Satisfaction and Implementation Assessment Questionnaire

Section 1: Satisfaction with New Teaching Techniques

On a scale of 1 to 5 (1 being very dissatisfied and 5 being very satisfied), please rate your overall satisfaction with the new teaching techniques introduced, including the use of welding simulators, Zoom lectures, Moodle integration, recognition of prior learning, work-based learning, video utilization, and the improved classroom lectures.

1 2 3 4 5

Which specific teaching technique did you find most effective, and why?

Conversely, if there were challenges or areas of dissatisfaction, please specify those along with any suggestions for improvement.

Section 2: Implementation Feedback

To what extent have you implemented the new teaching techniques in your MIG/MAG welding training sessions?

-Not at all

-To a limited extent

-Moderately

-Extensively

-Fully integrated

What factors facilitated the successful implementation of these techniques in your teaching?

If you faced challenges in implementing any of the techniques, please elaborate on the nature of these challenges.

Section 3: Additional Comments

Is there anything else you would like to share regarding your experience with the new teaching techniques or any recommendations for further enhancements?

2.3.2 In depth interview of teacher satisfaction

1. How would you rate your overall satisfaction with the new teaching techniques introduced in the MIG/MAG welding training program, and why?
2. Can you identify specific teaching techniques that you found particularly effective in enhancing the learning experience for your students?
3. Were there any challenges or obstacles you encountered while implementing the new teaching techniques? If so, how did you overcome them?
4. To what extent have you integrated the new teaching techniques into your MIG/MAG welding training sessions? Can you provide examples of how you incorporated these methods?
5. Have you observed any notable changes in student engagement or understanding since the implementation of the new teaching techniques?
6. How do you assess the impact of using welding simulators in your training sessions? Have you noticed any improvements in students' practical skills?
7. In your experience with Zoom lectures, how has the transition to online teaching affected student participation and comprehension?
8. How has the integration of Moodle as a learning management system influenced the organization and accessibility of course materials? Have you received any feedback from students on this aspect?
9. Regarding the recognition of prior learning, can you share examples of how this approach has been applied in your teaching, and what results or benefits you've observed?
10. Have you used videos as a teaching medium, and if so, what impact have they had on students' understanding of theoretical concepts and practical applications?
11. How have work-based learning strategies been implemented in your training sessions, and what feedback have you received from students regarding this approach?
12. Have you noticed any changes in the overall satisfaction or enthusiasm of students since the implementation of the new teaching techniques?

13. In your opinion, how important is continuous monitoring and assessment of the implementation of these teaching techniques for ensuring their effectiveness?
14. Can you share any specific results or success stories from students who have been exposed to the newly implemented teaching methods?
15. How do you envision the future evolution of teaching techniques in MIG/MAG welding training, and what improvements or enhancements would you like to see in the program?

2.3.3 Student satisfaction questionnaire

Section 1: Overall Satisfaction

On a scale of 1 to 5 (1 being very dissatisfied and 5 being very satisfied), how would you rate your overall satisfaction with the new teaching methods introduced in the MIG/MAG welding training program?

1 2 3 4 5

Section 2: Specific Teaching Methods

Which specific teaching method have you found most effective in understanding theoretical concepts and practical applications?

Have you encountered any challenges or difficulties in adapting to the new teaching methods? If so, please provide details.

Section 3: Virtual Learning Experience (if applicable)

If you have participated in Zoom lectures or utilized online platforms like Moodle, how would you rate your experience with virtual learning?

- Very Unsatisfactory
- Unsatisfactory
- Neutral
- Satisfactory
- Very Satisfactory

What aspects of virtual learning do you find most beneficial or challenging?

Section 4: Practical Training and Simulators

How has the use of welding simulators contributed to your practical skills development?

Have you participated in any work-based learning activities? If so, how do you perceive their impact on your understanding and application of MIG/MAG welding techniques?

Section 5: Recognition of Prior Learning

How do you feel about the recognition of prior learning experiences in the training program?

How has it influenced your learning journey?

Section 6: Videos as a Learning Medium

How beneficial do you find the use of videos as a teaching medium for explaining welding techniques and processes?

Section 7: General Comments

Is there anything else you would like to share regarding your experience with the new teaching methods or any suggestions for improvement?

3. Evaluation of the assessment results

The results from the teacher questionnaire underscore a positive reception of the newly introduced teaching methods in the MIG/MAG welding training program. Teachers expressed high levels of satisfaction with the innovative approaches, ranging from welding simulators and Zoom lectures to recognition of prior learning and improved classroom lectures. The overall positive feedback from instructors indicates a successful integration of these methods into the curriculum, resulting in heightened student engagement, improved understanding, and enhanced practical skill development. This constructive response encourages continued exploration and refinement of these teaching techniques, aligning with the commitment to providing high-quality education in the field of MIG/MAG welding.

While the teacher interviews yielded largely positive results, a notable challenge emerged concerning students' adaptation to the Moodle platform. Instructors reported that students encountered difficulties in navigating and using Moodle effectively, requiring additional time for familiarization. This feedback highlights the need for targeted support and training to address usability issues and ensure a smoother integration of the online learning platform. Recognizing this challenge, efforts will be directed towards providing necessary resources and

guidance to both instructors and students, ensuring that the benefits of the Moodle platform can be fully realized without hindrance.

In the student questionnaire, responses were overwhelmingly positive, with a notable emphasis on the practical work and simulator activities. Students expressed satisfaction with the hands-on learning experiences, citing them as beneficial to their understanding and application of MIG/MAG welding techniques. The positive feedback on simulator work indicates that these innovative tools have effectively enriched the learning experience, providing a dynamic and risk-free environment for students to hone their skills. This student-centric perspective aligns with the overarching goal of delivering a well-rounded and engaging education in MIG/MAG welding, emphasizing the importance of practical application in conjunction with theoretical knowledge.

4. Conclusions

In conclusion, the journey undertaken at IZV to enhance the MIG/MAG welding training program has yielded promising results. The positive feedback from teachers, despite some challenges with the Moodle platform, affirms the success of the newly implemented teaching methods. The innovative approaches, including welding simulators, Zoom lectures, and recognition of prior learning, have significantly contributed to heightened student engagement, improved understanding, and enhanced practical skill development. While addressing the challenges identified in the teacher interviews, the commitment to refining and optimizing these methodologies remains unwavering, reflecting a dedication to delivering education that aligns with industry standards and promotes continuous improvement in the welding field.

Moreover, the overwhelmingly positive responses from students, particularly in their appreciation for practical work and simulator activities, reinforce the impact of these innovative teaching methods. The hands-on experiences have not only enriched their learning journey but have also set a precedent for a dynamic and immersive education in MIG/MAG welding. As we navigate the evolving landscape of welding education, the synergies between teacher satisfaction, student engagement, and the commitment to ongoing improvement collectively shape the future of our MIG/MAG welding training program. This journey signifies a steadfast dedication to excellence, ensuring that our students are not only equipped with theoretical knowledge but are also well-prepared for the practical challenges of the welding industry.



This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.
ERASMUS+: